The Growing Share of Services in the U.S. Economy — Degeneration or Evolution?

Mack Ott

Surely the American people are not willing to become merely a service economy. The American character is as much built around the sinews and muscle of the factory line as the white-collar office.[1]

— Editorial, *Christian Science Monitor*

Since World War II, the production of services as a share of U.S. real gross national product (GNP) has risen from 58 percent to 68 percent. The concomitant shift in the distribution of the labor force has been much larger: about half of U.S. workers were employed in service industries in 1948; this proportion had increased to nearly three-fourths by 1985. These momentous changes have given rise to fears that the United States is fast becoming a nation of people who are "serving each other hamburgers or taking in each other's laundry."[2]

The irony in this view is that it embodies a profound misinterpretation of U.S. economic history, both recent and long-term. It has been the strength, rather than the weakness, of the manufacturing sector that has precipitated the shifts in employment and output toward services. Put simply, high productivity growth in manufacturing and agriculture and the long-term effects of American investment in education have made the faster growth of the service sector possible. These forces have persisted not just since World War II, but for a century or more. Similar trends in output and labor characterize the last century of economic history in other industrial nations as well.

The purpose of this article is to document these long-run trends and to highlight some of the forces driving them. The conclusion from this overview is that, far from indicating a decline in the U.S. economic outlook, the rising share of services reflects the increasing productivity and well-being of workers, both inside and outside of U.S. factories and mills.

OUTPUT, LABOR AND CAPITAL EMPLOYMENT IN THE UNITED STATES SINCE 1948: A BRIEF REVIEW

During the postwar era, output of the U.S. economy as measured by real GNP has more than tripled, from $1.1 trillion (in 1982 dollars) in 1948 to $3.7 trillion in 1986. Meanwhile, civilian employment nearly doubled, from 58.3 million to 109.6 million. Since the economy has been growing, analysis is greatly facilitated by considering proportional shares rather than levels of output and labor. Chart 1 shows that, while the services share of output has risen and, consequently, the commodities share has fallen, the share of real GNP in manufacturing output has remained virtu-

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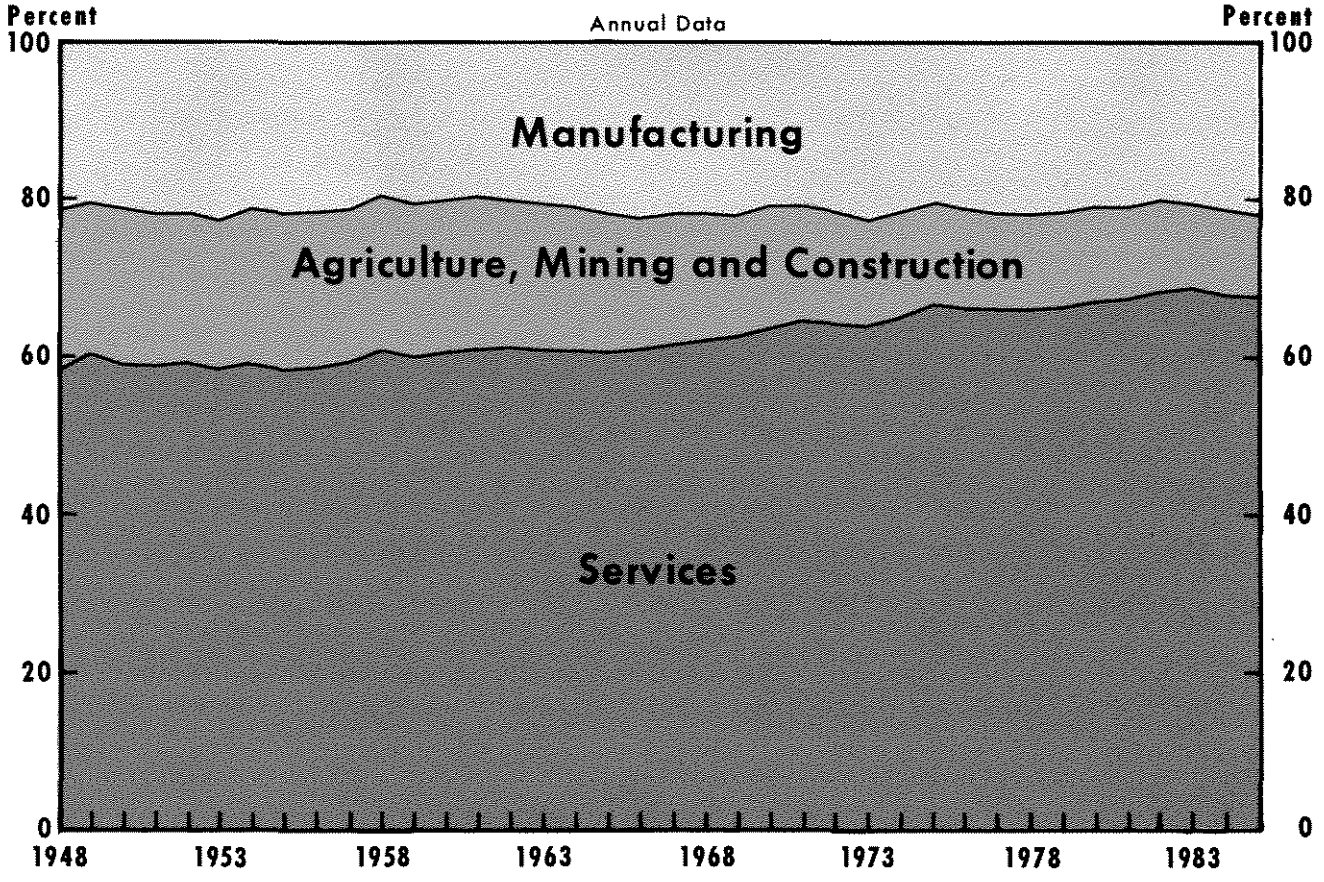
[1]See *Christian Science Monitor* (1987).

[2]Murray (1987). Of course, many economists and commentators have countered this simplistic characterization of rising service employment and output; for example, see Browne (1986), Krugman and Hatsopoulos (1987), McUsic (1987), Shelp and Hart (1986), Tatom (1986, 1987) and Seaberry (1987). The phrase has become so idiomatic that Browne used it as the title of an article debunking its thrust. She points out that the share of employment in the narrow service sector ("other services" in this article) has been rising faster than manufacturing for some time.

Chart 1

Distribution of Real GNP 1948—1985



ally unchanged at roughly 21 percent.[3] Consequently, the widespread perception of U.S. deindustrialization is puzzling.

In 1948, 31.4 million Americans were gainfully employed in service industries and 26.9 million in commodities production. Service sector employment since then has grown apace with total employment, rising to 83.2 million in 1985. Concurrently, employment in the commodity sector has grown much more slowly. In particular, agricultural employment declined by over half, from 6.6 million workers to 3.0 million, mining fluctuated around 1.1 million, construction varied between 3 million and 5 million, and manufacturing grew from 16 million to a peak of 20.9 million in 1979, then declined to around 19.2 million in 1985.

As a result of its faster growth, the share of employment in the services sector has risen during the four postwar decades, from about 54 percent in 1948 to 72 percent in 1985. As table 1 shows, the postwar rise in the share of labor (L) in services and its fall in commodities has been persistent and general across subsectors. Among the service subsectors, other services rose from a 13.2 to a 23.2 percent employment share; government employment rose from 11.7 to 18.3 percent, then tailed off to 16.3 percent; and finance nearly

[3]The commodities sector includes agriculture, manufacturing, mining and construction industries; agriculture, in turn, includes forestry and fishing. The services sector includes transportation, communications, utilities, wholesale trade, retail trade, finance, and other services industries; finance includes banking, thrift, finance and real estate, and other services includes personal services, business services, auto repair, health services, legal services and miscellaneous professional services. To mitigate the unavoidable confusion between the services sector and its other services subsector, the subsector will be referred to as *other services* unless the context makes this unnecessary.

Table 1

U.S. Input and Output Shares by Industrial Sectors, 1948–85

	1948			1956			1964			1972			1980			1985		
	L	K	Y	L	K	Y	L	K	Y	L	K	Y	L	K	Y	L	K	Y
COMMODITIES	46.2%*	41.2%	41.2%	41.7%	42.5%	41.3%	37.2%	40.0%	39.3%	33.9%	38.1%	35.8%	31.2%	38.8%	32.7%	28.1%	35.6%	32.4%
Agriculture	11.4*	7.5	5.5	8.2	7.8*	4.4*	5.7	6.7	3.3	3.9	6.3	2.7	3.4	6.5	2.4	2.9	4.9	2.6
Manufacturing	27.4	23.0	21.3	26.6*	22.6	22.6	25.1	21.7	21.6	23.6	22.7*	21.5	21.1	22.5	20.9	18.7	21.1	21.6
Mining	1.8*	8.0	6.5*	1.4	10.2	6.3	0.9	9.9*	5.3	0.8	7.3	5.2	1.1	7.7	4.3	0.9	8.1	3.6
Construction	5.7	2.6	8.0	5.6	2.0*	9.2	5.5	1.8	9.3*	5.6	1.9	6.4	5.6*	2.1	5.1	5.7	1.4	4.5
SERVICES	53.8%	59.3%	58.8%	58.3%	57.4%	58.7%	62.8%	59.9%	60.7%	66.1%	61.8%	64.2%	68.8%	61.3%	67.3%	71.9%*	64.4%*	67.6%*
Transportation	5.2*	25.8*	6.8*	4.6	18.3	4.9	3.8	13.3	4.1	3.5	10.1	4.2	3.2	8.9	4.1	3.1	7.6	3.5
Communications	1.3	3.5	0.8	1.3	4.4	1.0	1.2	5.6	1.2	1.4	6.5	1.8	1.3	7.8	2.5	1.2*	8.4*	2.6*
Utilities	0.9	11.0	1.2	0.9*	13.5	1.7	0.9	13.9*	2.2	0.9	13.9	2.5	0.8	12.8	2.7*	0.9	12.0	2.9
Wholesale Trade	4.9	1.5	5.0	5.1	1.6	5.1	5.2	2.1	5.6	5.3	2.7	6.7	5.6	3.2	6.7	5.6*	4.2*	7.4*
Retail Trade	13.5	4.4	9.5	13.7	4.2	9.2*	13.7	4.7	9.0	14.1	5.2	9.2	14.6	5.5	9.0	15.5*	6.1*	9.5
Finance, Insurance, Real Estate	3.2	9.6	9.6	3.9	11.0	10.9	4.4	14.0	12.4	5.0	15.9	13.5	5.7	15.6	14.6	6.2*	17.5*	14.6*
Other Services	13.2	3.5	11.5	13.5	4.5	10.4	16.1	6.2	11.6	17.8	7.5	12.3	20.4	7.5	13.9	23.2*	8.5*	15.0*
Government	11.7	—	13.8	15.3	—	14.6*	17.5	—	13.8	18.3*	—	13.1	17.1	—	12.0	16.3	—	11.1
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE: *Denotes maximal share attained within the preceding eight years; labor force is total employment, full and part-time; capital stock is real private, net reproducible tangible wealth in 1982 dollars.

SOURCE: *The National Income and Product Accounts of the United States, 1929–82*; for capital stock — *Survey of Current Business*, January 1986; for 1985 — *Survey of Current Business*, July 1986.

doubled, from 3.2 to 6.2 percent. Only transportation declined appreciably as railroads lost their dominance in freight and passenger markets to trucking and airline firms.

In commodities production, the share of labor in agriculture fell from 11.4 percent in 1948 to 2.9 percent in 1985, and mining's share halved, from 1.8 to 0.9 percent. Manufacturing employment, rising in absolute terms until 1979, fell persistently throughout the period in share terms, from 27.4 to 18.7 percent. Only construction had the same employment share, 5.7 percent, in 1985 as in 1948.

Table 1 also delineates the shifting capital (K) and output (Y) shares in the postwar U.S. economy. As was shown in chart 1, the commodities output share declined from 41.2 percent to 32.4 percent, but the decline was virtually all in agriculture, mining and construction. In services, the distribution of rising output shares during 1948–85 was quite diverse: Communications and utilities shares doubled and tripled, respectively, and financial services had the largest share increase — 5 percentage points — while government services and transportation had declining shares.

The decline in the transportation output share from 1948 (6.8 percent) to 1985 (3.5 percent) made the shift in the capital from commodities to services smaller than it otherwise would have been. As the railroad's share of transportation output fell from 1948 to 1985, there was a substitution of public for private capital in the transportation sector. The privately owned railroad capital stock — equipment and rights-of-way — was supplanted not only by privately owned trucks and aircraft but also by the publicly owned highways, airports and air control networks used by trucking companies and airlines.[4] If transportation capital were excluded from table 1, the change in the distribution of the capital stock from 1948 to 1985 would reveal a much greater rise in the service sector's capital share: from 44.5 percent in 1948 to 70.1 percent in 1985.

In sum, the postwar shift of the U.S. economy toward services has been pervasive: all sectors of services other than transportation and government have become proportionally larger and more capital-intensive. Thus, while it may be provocative to speak of the rising share of services as being produced by short-order cooks and laundry workers, it is grossly inaccurate (see opposite page): As illustrated in the postwar breakdown of the other services subsector, the service activities which have grown fastest since 1948 have been those in which capital investment — both in human skills and in physical equipment — have been substantial. More important, the shift toward services, did not commence in the 1970s, but characterizes the entire postwar era, and reflects a substantive shift in the occupational characteristics of the U.S. labor force as well.

WHY HAS THE SERVICE SECTOR EMPLOYMENT SHARE RISEN SINCE 1948?

There are two fundamentally interrelated reasons for the rise in the service sector's share of employment in the postwar era: slower growth in labor productivity and faster growth in the demand for services.[5]

Slower Productivity Growth in Services

Labor productivity is measured by the ratio of output per hour of labor input (Y/H). As table 2 shows, overall labor productivity in the U.S. economy rose at an average rate of 1.8 percent per year, from $11.23 per hour (in 1982 dollars) in 1948 to $21.66 per hour in 1985.[6] Productivity growth was much slower in the

[4]The rising share of capital in the truck and air carrier sectors has not been commensurate with their rising proportion of transport services. In 1948, the railroads accounted for about one-fifth of the entire U.S. capital stock, but by 1985, this share had shrunk to less than one-thirtieth. In terms of the transportation sector's capital stock, the railroad share fell from 78 percent in 1948 to 37 percent in 1985. Over this same period, the share of transportation output in GNP (1982 $) from railroads fell from 38 percent to just over 17 percent, while the share of truck and air carriers rose from 14.5 to 60 percent. Yet, the share of transportation capital in the truck and air carrier industries rose from about 7 to 36 percent, a much smaller increase than the decrease in the railroad capital stock.

[5]The relatively rapid productivity growth in manufacturing has been widely documented as an explanation for the declining labor input; see for example, Tatom (1986, 1987), McUsic (1986) and Krugman and Hatsopoulos (1986). The OECD's ongoing estimation of Purchasing Power Parity also provides support for optimists about the *level* of U.S. productivity. Real GDP per capita for the United States in 1986 is 41 percent greater than for Japan and 33 percent larger than for Germany. These ratios are essentially unchanged from 1985; see BIS (1987).

[6]When productivity is measured on a per worker basis, the results are even more divergent than the per hour basis shown in table 2 — 1.85 percent annual growth rate overall with 2.32 percent in commodities vs. 1.47 percent in noncommodities; however, the per worker data include self-employed, while the hourly data in table 2 do not. By reporting on a per hour basis, the distortion due to the divergent patterns of hours per week in different sectors are avoided, but at the cost of omitting data on entrepreneurs, proprietors and especially farmers who are the most important class of owner-operators (Indeed, the agriculture sector data underlying table 2 imply half-time employment throughout the 1948–85 period — 929 annual hours in 1948 and 1,068 in 1985.). When agriculture's productivity is measured per worker (including the self-employed owners), its growth rate during 1948–85 is 3.33 percent compared to the table 2 figure of 2.95 percent.

Is the Growth in Other Services Hamburgers and Laundry?

The most prominent service subsector in the postwar rise is "other services." Its labor share increase, 10 percentage points, is about equal to the employment share decline in manufacturing, and its rise in capital and output shares are exceeded only by those in finance, insurance and real estate (table 1). Clearly, it is this subsector that critics have in mind when they rail about rising service output being equivalent to U.S. industrial decay, and, in particular, declining job content for U.S. workers. A closer look (table below) at the other service sector, however, belies this characterization of both its output and employment trends. Hamburger cooks (actually enumerated in the retail subsector) and laundry attendants are by no means the primary force in the surge in service employment, in particular in other services.[1]

The table below reveals that the share of personal services — where laundry is reported — has actually declined. In fact, the 3.5 percentage-point rise in the other services share of output is more than accounted for by the rise in professional services. During the 1948–85 period, the share of U.S. GNP emanating from business, medicine, legal and miscellaneous professional services rose from 4.9 percent to 10.1 percent of GNP. Moreover, the 10 percentage-point rise in the service employment share is about the rise in employment in these professional services, an increase of 9.6 percentage points, and the rise in capital in business, medical and legal services accounts for 57 percent of the capital share increase.[2]

[1]For example, during 1977–82 (the most recent data available by occupation within industries), employment in eating places (waiters, waitresses and cooks) rose about 900,000; however, health services (non-hospital) rose over 600,000, legal services 150,000 and business services over 800,000, while laundry and dry cleaning establishments' employment fell by 8,000 during the same five years. The longer-term implications of this shift of occupational choice has been articulated by others; for example, see Freeman (1980), U.S. Congress (1984), Shelp and Hart (1986), Browne (1986), Seaberry (1987).

[2]Miscellaneous professional services include the services of architects, decorators, veterinarians and consultants not elsewhere classified. Capital in miscellaneous professional services is not separately measured.

Output, Labor and Capital Shares in Other Services

	1948			1960			1972			1985		
	Y	L	K	Y	L	K	Y	L	K	Y	L	K
Other Services	11.6%	13.2%	3.6%	11.4%	15.1%	5.3%	12.3%	17.8%	7.5%	15.0%	23.2%	8.5%
Personal	1.3	2.1	0.3	1.1	1.9	0.4	0.9	1.6	0.5	0.6	1.5	0.4
Business	1.0	0.7	0.3	1.4	1.3	0.7	2.0	2.3	1.5	3.3	4.5	2.2
Auto Repair	0.4	0.6	0.3	0.5	0.6	0.9	0.7	0.7	1.1	0.8	1.1	1.5
Health	2.2	1.9	0.3	2.6	2.7	0.7	3.4	4.3	1.1	4.3	6.0	1.3
Legal	1.0	0.4	0.2	0.9	0.5	0.2	0.9	0.5	0.1	1.0	0.9	0.2
Misc. Prof.	0.7	0.4	N.A.	0.9	0.7	N.A.	1.1	1.0	N.A.	1.5	1.6	N.A.
Other	4.9	7.1	2.2	4.0	7.5	2.5	3.4	7.4	3.2	3.3	7.7	3.0

SOURCE: *The National Income and Product Accounts of the United States, 1929–82*; for capital stock — *Survey of Current Business*, January 1986; for 1985 — *Survey of Current Business*, July 1986.

Table 2

U.S. Output-Labor Hour and Capital-Labor Hour Ratios by Industrial Subsectors, 1948–85 (thousands of 1982 dollars)

	Overall	Commodities				Services[2]					
	Total	AG[1]	MIN	CONS	MFG	Total	TRAN	COM	UTIL	WHO	RET	FIN	SERV
Y/H 1948	$11.23	$10.74	$ 9.95	$ 38.16	$19.82	$ 7.84	$11.57	$12.50	$ 6.59	$ 12.88	$10.22	$ 8.03	$32.94	$10.29
Y/H 1985	21.66	22.54	29.17	67.79	17.78	20.81	20.78	22.75	38.38	60.95	24.65	12.88	49.38	14.02
Growth Rate	1.79%	2.02%	2.95%	1.56%	–0.29%	2.67%	1.60%	1.63%	4.87%	4.29%	2.41%	1.29%	1.11%	0.84%
K/H 1948	$10.99	$ 8.94	$11.57	$ 40.06	$ 4.29	$ 7.16	$13.05	$39.93	$ 24.21	$101.46	$ 2.56	$ 3.14	$27.62	$ 2.67
K/H 1985	24.26	24.67	55.34	150.83	5.64	20.24	24.02	49.67	123.28	248.52	14.05	8.28	58.9	7.95
Growth Rate	2.16%	2.78%	4.32%	3.65%	0.73%	2.84%	1.66%	0.99%	4.49%	2.45%	4.70%	2.65%	2.06%	2.99%

[1] Capital is real fixed reproducible nonresidential capital — equipment and structures. Since land is also a form of capital and of key importance in agriculture, the omission of land implies that the capital-labor ratios for agriculture are understated.

[2] Output, labor and capital exclude the government subsector.

SOURCE: *The National Income and Product Accounts of the United States, 1929–82* and *Survey of Current Business*, July 1986 for real GNP and labor hours; for capital stock—*Survey of Current Business*, January and July 1986.

service sector (1.6 percent per year) than in the commodity sector (2.0 percent per year).

The slower productivity growth in services was not at all uniform across its subsectors. Labor productivity growth in communications (COM) was the fastest of all subsectors, and it was nearly as fast in utilities (UTIL). At the same time, wholesale trade (WHO) labor productivity grew faster than the average rate of the commodity industries. Yet, as noted earlier, the employment shares in these service categories did not rise appreciably during the postwar era. The subsectors that accounted for virtually the entire increase in the service employment shares — other services, retail trade and finance — had average annual productivity growth rates of only about 1 percent.

Perhaps some of this slower productivity growth resulted from the shorter average work year in services (measured in hours), implying a large component of part-time employment. In 1985, the average hours per employee in commodities, 1,783 hours, was nearly three weeks longer than the average in noncommodities, 1,672 hours; moreover, in the service sector annual hours varied considerably. For example, communications and utilities workers averaged 1,986 and 1,936 hours in 1985, roughly the same as the average in manufacturing, 1,942 hours; in contrast the other services, finance and retail sectors each had average employee hours of less than 1,670 hours. Conversely, construction (1,575 hours) and agriculture (1,068 hours) also had low annual hours. Both industries are seasonal and susceptible to the vagaries of weather, but construction has had negative productivity growth while agriculture's productivity growth has been very high. Thus, low hours in and of themself do not provide an explanation for slow productivity growth.

Rising labor productivity results from either an increase in the proficiency of workers — an increase in human capital — or an increase in plant and equipment — nonhuman capital.[7] Focusing for the moment on nonhuman capital, table 2 shows that during 1948–85, capital-labor ratios (K/H) have at least doubled in every sector of the U.S. economy except construction and transportation, and that productivity (Y/H) generally has grown faster in those sectors with faster capital growth (K/H).[8] As with productivity, however, these ratios have risen more slowly in services (1.7 percent per year) than in commodities (2.8 percent per year).[9]

While productivity growth has been slower overall in services, it has resulted from neither a dearth of investment nor intrinsically lower capital intensity of services; indeed, as noted earlier, if one omits transportation, capital grew much more rapidly in services than in commodities production. As shown in table 2, capital-labor ratios have been consistently higher in four of the seven service sectors than in manufacturing, and the capital-labor ratios in the communications and wholesale categories were the fastest growing of all sectors. Moreover, in every industrial sector, capital has grown more rapidly than labor since 1948.[10] In particular, the capital-labor ratio in other services grew faster than that in manufacturing — 3.0 percent vs. 2.8 percent — even though the other services share of labor was rising while the manufacturing share of

[7]Theodore W. Shultz is the economist most influential in developing the notion of "human capital" for the reservoir of skills, proficiencies and knowledge, for which he was awarded the 1979 Nobel Prize in Economics; see Shultz (1961). The rise in this productive capacity of workers comes from two sources. Experience, sometimes referred to as the learning curve, enhances the rapidity and accuracy of workers in completing assigned tasks. Formal training, both classroom and on-the-job, increases the understanding and insight of workers, which leads to rising facility and quality through better methods and product innovation.

[8]The rank-order correlation between the 1948–85 sectoral growth rates of Y/H and K/H in table 2 is .46; if transportation is omitted (given the distortion in the capital-labor-output relations entailed in the shift from railway to airline and trucking), the rank order correlation is .53. Both correlation statistics are significant at the 5 percent level.

[9]Evaluating the impact of the increased capital input fully would require a consideration of the quality of capital and technological change. Also, the real price of a machine with given capacity may have declined during the 1948–85 period; if so, the quantity of capital would be understated. More important, technological advances occurred during this period, especially in computer-controlled manufacturing processes. For example, numerical control and multi-axis omnimills have made possible the manufacture of aircraft and rocket engines to tolerances not feasible at the beginning of the period. These applications also have reduced the labor input required in design and engineering processes through the automation of drafting and modeling procedures. Proliferation of these changes can be sampled by a glance at want-ads for CAD/CAM workers — computer-aided design and computer-aided manufacturing. Moreover, the growth of capital-labor ratios is driven both by capital growth and labor growth. As table 1 shows, the share of both capital and labor have risen in services, while labor has fallen and capital has risen in commodities, especially agriculture. Thus, labor shifts may amplify or attenuate the accompanying capital increases in terms of the capital-labor ratios.

[10]Since the employment share fell in manufacturing, it is possible that the increases in capital-labor ratios, were due to falling employment rather than rising capital. Yet, as table 1 shows, the share of private, net U.S. nonresidential capital in manufacturing, like its share of output, has remained relatively constant at about 22 percent during the postwar period. Thus, capital invested in manufacturing industries has grown apace with its output.

Table 3
Relative Prices of Commodities and Services in U.S. GNP, 1948–86 (1982 = 100)

	1948	1952	1956	1960	1964	1968	1972	1976	1980	1984	1986[3]
Implicit GNP Deflator, Prices of Durable Goods as Numeraire[1]											
Consumption											
Durable Goods	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Nondurable Goods	76.8	76.1	74.3	74.5	187.2	77.8	82.5	91.8	100.2	102.9	101.5
Services	53.1	58.1	64.6	68.0	69.1	73.5	81.3	86.0	94.1	112.2	116.2
Fixed-Weight GNP Price Index, Prices of Goods as Numeraire[2]											
Goods				100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Services				70.9	73.5	78.0	85.6	90.6	94.7	100.0	113.5
Structures				59.4	57.7	60.1	68.9	80.3	98.9	100.0	98.8

[1] Nondurable goods are those with assumed useful lives of three years or less, such as clothing, food and publications.
[2] Not available prior to 1959.
[3] 1986 based on preliminary IV/1986 data.

SOURCE: *Survey of Current Business*, tables 7.4, 7.2.

labor was falling. In summary, capital investment was rapid in each service sector except transportation.[11]

Faster Demand Growth in Services

There is substantive evidence that the postwar rise in the share of U.S. output in services reflects a relative shift in final demand for services and away from commodities. Output of services has risen as a share of total output (table 1); a rise in the relative price of services, then, can only mean that the demand for them also has increased relative to commodities. As shown in table 3, the relative price of consumption services measured in terms of the price of durable goods has more than doubled since 1948.[12] More generally, the lower half of the table indicates that the relative price of all services (producers' as well as consumers') measured in terms of the price of goods has risen by about two-thirds since 1960.

Why has the demand for services risen as a share of output even though their prices relative to commodities have risen? One plausible answer is that the quality of services has risen, and the data, unadjusted for the quality improvement, understate quantity and, therefore, overstate price.[13]

Another answer that has been advanced by development economists and economic historians is that, as economies mature, rising income is progressively directed toward purchases of "higher-order" or luxury goods of which services predominate. Thus, Clark (1951) found that:

[11]As table 1 shows, except for transportation and utilities, the service subsectors' capital shares all attain their maximums (denoted by asterisks) at the most recent observation; in contrast, in the commodities sectors, the maximum capital share in each subsector occurs considerably earlier.

[12]That is, construct a bundle of consumer durable goods (such as televisions, electric mixers and bowling balls) and a bundle of consumer services (such as dentist's visits, movie tickets and automobile servicing) each costing $1,000 in 1982. Thus, by construction, the relative price of the services in terms of the durable goods was 100 percent in 1982 prices. Comparing the same bundles in 1948, table 3 implies that the price of the service bundle was only 53 percent of the durable goods bundle, while in 1985 its relative price was 116 percent.

[13]Service output is primarily measured in terms of inputs; thus, if inputs, especially labor, increase in their productivity — e.g., physicians or accountants and lawyers assisted by computer — their hourly charges will rise and, uncorrected for the quality rise, the unit price will incorrectly be raised by the same amount. Such errors would also lead to understated productivity growth in table 2. Marimont (1969), who provides a detailed description of the methods and shortcomings of the U.S. Commerce Department's accounting procedures for services, eloquently encapsules this measurement problem (p.16):

> The industries that are the subject of this paper do not make a pair of shoes, a refrigerator, or a drill press; all of which are tangible and can be counted, although with varying degrees of ambiguity. Instead, they provide services, that is, they safeguard savings, insure lives, lend money, advertise businesses, audit books, restore health, repair cars, and so on. Conceptual questions that are extremely difficult to answer are raised when one attempts to count such units of output or measure changes in their quality in order to provide a meaningful and consistent measure of their contribution to total GNP.

> . . . in the most advanced countries the demand for manufactured goods tends to settle down finally at about 20–25 percent of the national income. The demand for farm products falls to 10 percent of national income, and will fall lower as income advances further. It follows that in the most advanced countries the demand for services, including building and handicrafts and the products of small-scale manufacture, will rise to 70 percent or more of national income.[14]

LONG-RUN TRENDS IN THE DISTRIBUTION OF OUTPUT AND INPUT SHARES

The discussion of the U.S. postwar economy, the data in tables 1–3, and the shaded insert on page 9 clearly establish five characteristics about the evolution of output and input shares:

- The share of U.S. output in services has risen steadily over the entire 1948–85 period;
- Labor productivity has grown faster in the commodities sector than in the services sector;
- The shift in output has reflected a relative shift in consumer demand toward services;
- Labor and capital inputs have persistently risen in services production;
- The shift of labor into the services subsector of "other services" production has been primarily into activities requiring specialized skills, not into unskilled activities.

These observations raise questions about the long-run character of U.S. economic development:

- How long has the relative rise in service production and employment been going on?
- What has happened to the distribution of U.S. labor by occupation over longer time periods?
- Are the other major industrial economies experiencing similar or parallel employment and output evolutionary patterns?

Output and Labor Shares in the U.S. Economy, 1800–1985

The main currents driving the evolution of U.S. output and labor distribution since 1800 have been the rising productivity of labor successively in agriculture and manufacturing. Agriculture absorbed nearly three-quarters of the labor force in 1800 (persons aged 10 years and older, free and slave) with the residual being poorly accounted for.[15] By 1840, agricultural employment still occupied between 60 and 70 percent of American labor; however, the share of employment in manufacturing and construction had risen from 3 percent in 1810 to about 14 percent. In 1860, agriculture's share was still about 60 percent of the free labor force compared with more than 18 percent in manufacturing and construction.[16] While pre-Civil War data are not available for an analysis of output by industry in constant dollars, it has been estimated that in 1879 prices, the 1839 and 1859 agricultural shares of total commodity output were 72 percent and 55 percent, respectively, while manufacturing's shares in the same years were 17 percent and 32 percent.[17]

More consistent data are available on the distribution of output and labor for the period from 1870 to 1940. Unfortunately, the output data are for national income in current prices, which distort the distribution of shares among sectors.[18] Nonetheless, with these caveats, the data on national income and employment shares by industry for 1870–1940 are presented in table 4.

The most obvious characteristic of the data in table 4 is the steady rise in the proportion of the labor force in service production over the 70-year period, along with the concomitant decline in the proportion of labor in commodity production. The proportion of the labor force in agriculture fell from one-half in 1870 to about one-sixth in 1940. Although the manufacturing share rose over this period, most of the labor released from agriculture went to services production, whose share roughly doubled. While the distribution of employment gains varies across the various service categories, every category's share rises strongly.

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[14]Clark (1951), p. 366. Clark first advanced the notion of higher-order goods (luxury goods) in the initial, 1940 edition of his book, which argued that the service output share would rise with economic development; he presented international and historic evidence to support his assertions. See Beeson and Bryan (1986) for a discussion of higher-order goods.

[15]Lebergott (1964), table A-1, p. 510.

[16]Lebergott (1964), table A-1 and Fabricant (1949), table 2, p. 42.

[17]Table F-238-249, p. 239, *U.S. Historical Data Colonial Times to 1970*.

[18]Gross National Product (GNP) less capital consumption allowance (estimated depreciation) equals Net National Product (NNP). NNP less indirect business taxes plus subsidies less current surplus from government enterprises equals National Income (NI). NI is convenient for some analyses because it is equal to the sum of all payments to factors of production — wages and salaries plus profits plus rent plus interest. Two distortions are introduced by taking shares of NI in current dollars rather than GNP in constant dollars: First, if productivity in agriculture and manufacturing grew faster than in other sectors, the resulting decline in unit prices over the 70 years in these sectors will overstate their share in real terms in early years and understate it in later years. Also, since national income omits depreciation, indirect taxes and subsidies, the data also may distort the shares relative to total value added on a real GNP basis. For an illustration of how changes in the relative price of manufacturing affects shares of real GNP, see table 3 in Perna (1986), p. 32.

Table 4

U.S. Labor and Output Shares by Industrial Sector, 1870–1940

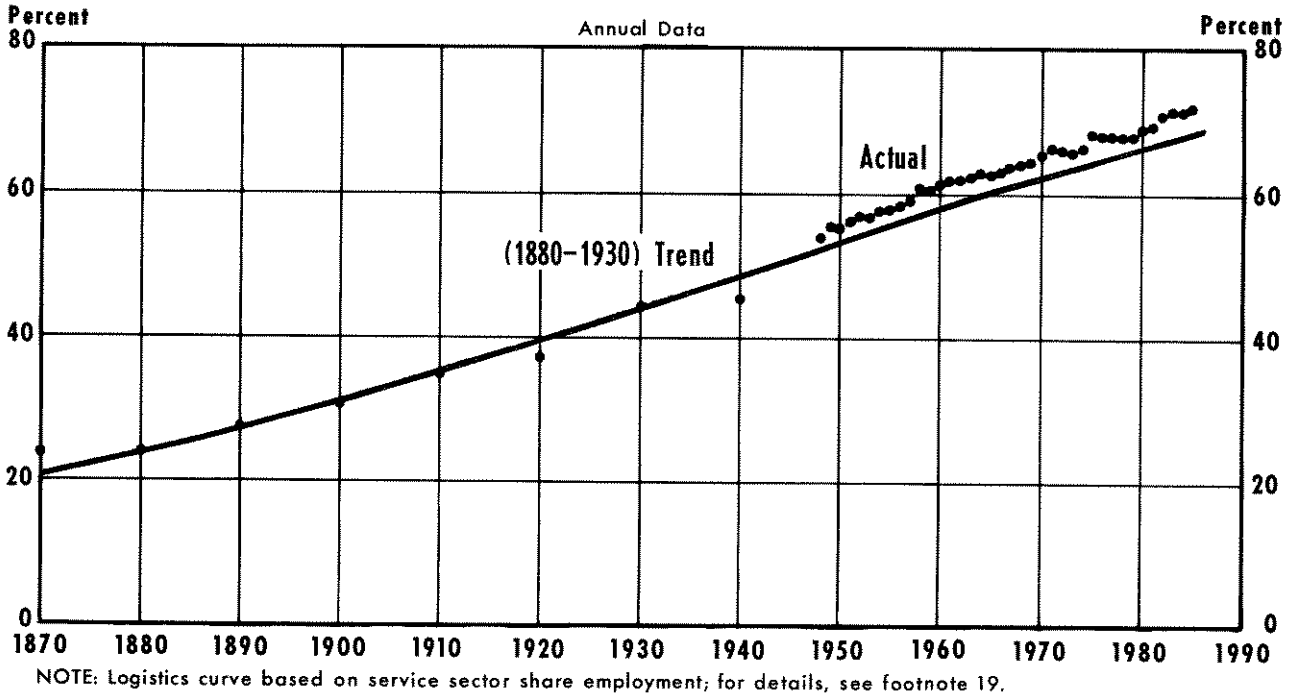
	1870		1890		1900		1910		1920		1930		1940	
	L	Y	L	Y	L	Y	L	Y	L	Y	L	Y	L	Y
Commodity Production	74.9%	44.0%	74.8%	39.4%	70.9%	41.1%	67.7%	43.7%	62.8%	46.5%	61.7%	47.1%	53.1%	38.0%	49.2%	38.8%
Agriculture	49.7	22.2	50.0	19.0	42.8	14.2	37.5	18.8	31.5	19.8	27.4	15.4	22.1	9.3	17.2	9.7
Mining	1.5	1.5	1.8	2.1	2.0	2.1	2.6	2.8	2.9	3.4	3.0	3.8	2.4	2.6	2.1	2.5
Construction	5.8	5.7	4.8	5.0	6.1	5.0	5.7	3.9	6.2	4.0	5.2	3.2	6.2	4.0	6.6	2.6
Manufacturing	17.4	14.6	18.2	13.3	20.0	18.9	21.8	18.2	22.3	19.3	26.1	24.6	22.5	22.0	22.4	24.0
Services Production	23.9%	56.0%	24.0%	60.6%	28.3%	58.9%	31.1%	57.2%	35.1%	53.5%	37.4%	52.4%	44.2%	61.9%	45.5%	61.2%
Transportation, Communications, and Utilities	4.8	10.9	4.7	12.9	6.2	11.2	7.0	10.5	8.2	10.7	9.6	11.7	9.3	11.8	7.2	10.4
Retail and Wholesale Trade	6.1	15.2	6.6	16.1	7.7	16.8	8.5	16.8	9.1	16.0	9.8	14.7	12.4	14.7	13.5	12.1
Finance, Insurance Real Estate	0.3	11.5	0.4	12.0	0.7	13.1	1.0	12.4	1.4	12.5	1.9	11.3	2.9	14.7	2.9	11.8
Other Services	10.7	14.2	10.0	15.2	11.3	12.5	11.8	11.0	12.9	9.1	11.6	7.9	14.7	10.9	16.2	10.3
Government	1.9	4.2	2.3	4.5	2.5	5.2	2.8	6.5	3.5	5.3	4.5	7.3	4.9	7.8	5.7	16.7
Industry Not Specified	1.2%	—	1.1%	—	0.7%	—	1.2%	—	2.0%	—	0.9%	—	2.7%	—	6.2%	—

NOTE: Totals may not add to 100.0 percent due to rounding. For 1870–1930 labor includes persons 10 years and older; 1940 includes 14 years and older. Income is current dollars national income for one year earlier than column heading, except for 1940 which is 1937.

SOURCE: National income, U.S. Department of Commerce, *Long Term Economic Growth, 1860–1970*, Series 141–151; Labor, Carson (1949), table 1.

Chart 2

Share of Employment in U.S. Service Sector 1870–1985



NOTE: Logistics curve based on service sector share employment; for details, see footnote 19.

Overall, the shift of employment from commodity to services production has been both persistent and relatively steady. An examination of the data from 1880 to 1930 reveals that the share of employment in services grew at an average annual rate of about 1.8 percent.[19] Applying this 1880–1930 trend growth rate to the 1880 labor share and projecting it over the succeeding 105 years, as chart 2 does, fits the rising labor share reasonably well. The predicted 1985 services labor force share is 68.5 percent, while the actual labor share in services production for 1985 (from table 1) is 71.9 percent. Apparently, the shift from commodities to services has been proceeding fairly steadily for more than a century.[20]

The Distribution of U.S. Labor By Occupation, 1900–80

The analysis thus far has categorized output, labor and capital by industrial sector. Yet, industrial firms in commodities employ a wide variety of support staff as

[19]By definition, the employment share in services must lie between 0 and 100 percent; consequently, a simple trend exponential growth rate is not relevant in forecasting the share. A logistic growth curve, $S_t = [1 + \exp\{a + b\,(t\text{-}1880)\}]^{-1}$, meets the boundary constraints and is easily fit to the data in table 4. The parameters ($a = 1.1527$, $b = -.0184$) were computed using the observed shares for 1880 and 1930; these years were used to avoid the labor market disruptions following the Civil War and World War I and the distortions of the 1930s.

[20]Less can be said about the pattern of relative production since the national income data are in current prices; however, there was clearly a shift from agriculture to manufacturing within commodities and a moderate shift from commodities to services, both starting around 1920.

well as industrial craftsmen, operatives and labor — including lawyers, nurses, accountants, gardeners, and even cooks and laundry workers. Consequently, any change in the amount of support work accomplished outside of the corporation by subcontracting for services will change the distribution of employment even if the set of tasks being accomplished overall is unchanged.[21]

On the other hand, the set of tasks to be accomplished in any production activity has evolved during this century due to innovation and capital investment, particularly investment in human capital.[22] For example, in the production of machine tools since 1900, the relative labor inputs of engineers, designers, computer operators and the like have risen relative to machinists, other craftsmen and operatives. Thus, a more complete picture of the distribution of the U.S. labor force can be obtained by considering its occupational as well as its industrial distribution. The occupational breakdown of U.S. employment based on the U.S. decennial censuses for 1900–80 is given in table 5.

Several features of the occupational distribution's evolution are clarified by the data in table 5 which shows U.S. census percentage distribution of workers by standard occupational categories.[23] First, as indicated earlier, the share of employees in agricultural occupations has declined precipitously — from 37.6 percent in 1900 to 2.8 percent in 1980 (the sum of farmers and farm labor entries in table 5). More striking, however, is the rise in the share of technical and managerial occupations and the decline of unskilled or unspecialized labor. In 1900, private household workers plus farm plus nonfarm labor accounted for 35.6 percent of employment, while technical and managerial occupations absorbed about 10.1 percent; in 1980, these low-skill labor categories constituted only 6.6 percent of the labor force, while management and technical occupations had increased to a 27.3 percent share.[24] Although skilled manual trades — craftsmen, foremen and operatives — made up a larger share of the labor force in 1980 than they did in 1900, this share had declined markedly from its peak in 1950 — from 34.4 percent to 26.7 percent. Most of this decline was in operatives, especially from 1970 to 1980; some may reflect the upgrading in job skill requirements to professional and technical, a category whose increase occurred primarily during these three decades.

A more informative taxonomy is to divide the occupational types into the following three categories: information provision and decisionmaking, direct production, and non-information services. These groupings, the subheadings in table 5, divide the census categories according to the primary form of output generated by the worker. The first category encompasses the production of information by decisionmakers and all the supporting design, analysis and record-keeping occupations and sales staff. The second comprises labor directly involved in production of goods and public utility services such as transport and electricity. The third consists of services other than information or utilities: private household services, police and fire services, and food and cleaning services. The evolution of labor shares within these more inclusive categories is rendered in chart 3 for the years 1900, 1950 and 1980.[25]

The data from table 5, summarized in chart 3, show that during this century the information and decisionmaking occupations have grown from about one-sixth of all employment to well over half. Direct production

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[21]That subcontracting of services is a key impetus in the rise of service employment was emphasized by several experts testifying in the congressional hearings on service industries. See U.S. Congress (1984). For example, Kravis argued:

> The other factor pushing up employment in the service industries is the tendency of commodity-producing industries to contract out services formerly performed in-house. . . . The advantages of employing outside specialists increase as technology becomes more complicated — for example, computerized accounting and — more capital intensive — cleaning office buildings, catering employee meals; the hiring of in-house [sic] lawyers to handle labor negotiations and tax matters.(p. 426)

[22]This implies the increasing importance of human capital in production, which, in turn, has been facilitated by a rise in the schooling of the average American worker. In 1900, the average American worker had completed 7.7 years of schooling; in 1957, schooling per worker was 11.0 years and in 1984, it was 12.1 years. Moreover, the school year, measured in average attendance per pupil, has increased by over 60 percent, from 99 days in 1900 to 159 days in 1957 to 162 days in 1970. See Shultz (1971) and U.S. Department of Commerce (1986), table No. 671, p. 397.

[23]One tacit measure of rising U.S. welfare is the increase in the age at which labor force entry is presumed to take place, from 10 years of age in the 19th century to 14 years in the mid-20th century to 16 years in the late 20th century. In part, this reflects the increasing investment in human capital through formal schooling.

[24]Considering only nonagricultural employment (that is excluding both farm management and farm labor), the share of unskilled labor fell from 28.7 percent of U.S. nonfarm employment in 1900 to 5.2 percent in 1980. During these eight decades, management, technical and other information occupations rose from 28.2 percent to 54.5 percent of persons employed in nonfarm occupations.

[25]The information category of employment was emphasized by several witnesses in the Congressional hearings on Service Industries [U.S. Congress (1984)], especially Levinson and Roach, pp. 261–87. This taxonomy does not quite conform to the commodities/services division used earlier since technical occupations include both medical diagnosis *and* treatment, while operatives include transportation and some other services such as occupations in public utilities.

Table 5
Occupational Distribution of the U.S. Labor Force

	1900	1910	1920	1930	1940	1950	1960[5]	1970	1980
Information Provision/Decisionmaking	17.6%	21.4%	24.9%	29.4%	31.1%	36.6%	40.1%	47.4%	53.0%
Professional and Technical	4.3	4.7	5.4	6.8	7.5	8.6	10.8	14.5	18.0
Managers, Officials and Proprietors (nonfarm)	5.8	6.6	6.6	7.4	7.3	8.7	8.1	8.1	9.3
Clerical and Administrative Support[1]	3.0	5.3	8.0	8.9	9.6	12.3	14.1	17.8	17.3
Sales Workers	4.5	4.7	4.9	6.3	6.7	7.0	7.1	7.0	8.4
Direct Production	73.3%	69.1%	67.1%	60.8%	57.2%	52.9%	43.7%	39.6%	34.1%
Farmers (including managers)	19.9	16.5	15.2	12.4	10.4	7.4	3.7	1.8	1.3
Farm Labor	17.7	14.4	11.7	8.8	7.0	4.4	2.3	1.3	1.5
Craftsmen and Foremen	10.5	11.6	13.0	12.8	12.0	14.2	13.6	13.9	12.9
Operatives	12.8	14.6	15.6	15.8	18.4	20.4	18.9	18.0	13.8
Nonfarm Labor[2]	12.5	12.0	11.6	11.0	9.4	6.6	5.2	4.7	4.5
Non-Information Services	9.0%	9.6%	7.8%	9.8%	11.7%	10.5%	11.2%	12.8%	12.9%
Private Household Workers	5.4	5.0	3.3	4.1	4.7	2.6	2.7	1.5	0.6
Other Service[3]	3.6	4.6	4.5	5.7	7.1	7.9	8.5	11.3	12.3
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Labor Force (millions)[4]	29,030	37,921	42,206	48,686	51,742	58,999	67,990	79,725	97,460

[1]Includes computer equipment operators, secretaries, stenographers, typists, financial record processing occupations, and mail and message distributing occupations.
[2]Mine labor included from 1970; prior to 1970, mine labor included in operatives.
[3]Includes protection (police, firefighters, private security), food service, and cleaning and building service occupations.
[4]Economically active population, from decennial census; prior to 1940, includes gainfully employed civilians 10 years and older, for 1940 and 1950 14 years and older, from 1960 on 16 years and older.
[5]Labor force includes workers not classified by occupation; occupational percentages computed on total of classified workers.

SOURCE: *Historical Statistics of U.S. Colonial Times to 1970*, Table Series D233-682; and 1980 *Census of Population*, General Social and Population Characteristics, U.S. Summary, Table 104.

labor, meanwhile, has fallen from about three-fourths of employment to about one-third. The principal source of the decline in production occupations has been agriculture, whose share fell from 37.5 percent in 1900 to less than 3 percent in 1980. Nonagricultural production occupations have a slightly lower share in 1980 than in 1900, but are well down from their maximum share of 41.1 percent attained in 1950. The non-information services share has increased slightly; in fact, since 1940, its share has risen by 1.2 percentage points with the decline in household services being slightly more than offset by the rise in other services (primarily protection — fire, police and security).

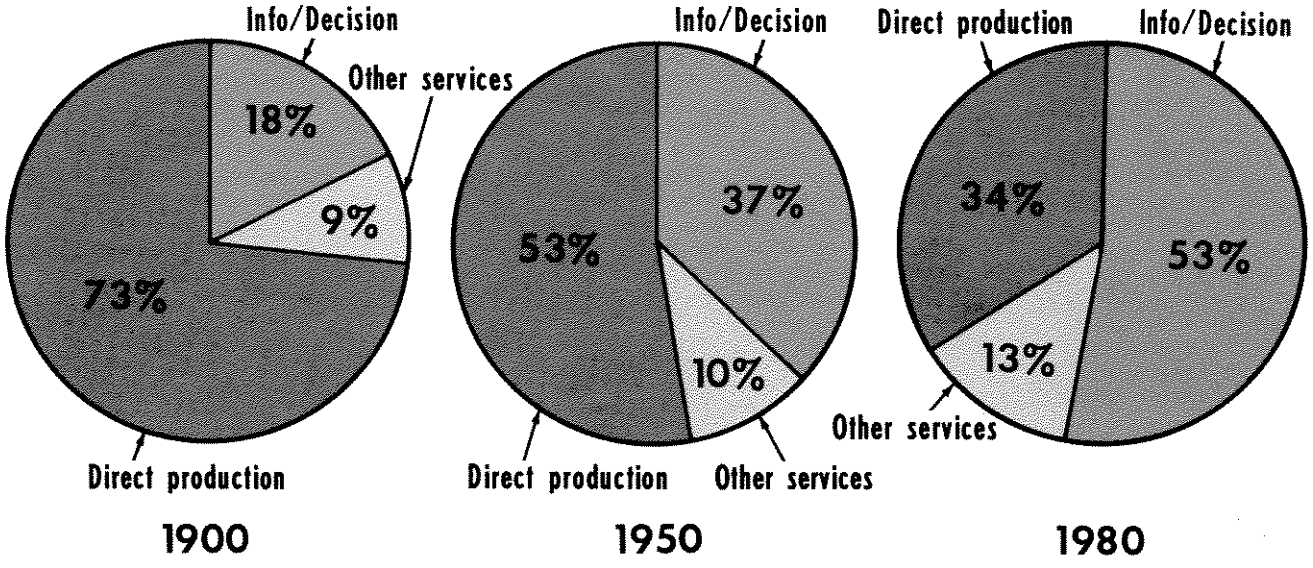
The data from table 5 also can be used to illustrate the relatively steady evolution of the U.S. occupational distribution in this century. A growth curve is fit to the labor share in information provision/decisionmaking occupations as it evolved during 1900–30. Projecting the share of employment in this category can then be used to determine if there have been abrupt shifts during the 1930–80 period.[26] As chart 4 shows, the projected share based on 1900–30 data fits the occupational distribution quite well, growing at an annual rate of about 2.2 percent: the predicted 1980 share is 55.9 percent, compared with its actual share of 53.0 percent (table 5). A similar exercise for the direct

[26]Since the employment share in information provision/decisionmaking must lie between 0 and 100 percent, a logistics curve is appropriate to assess the trend; see footnote 19. The fitted logistics curve using the 1900 and 1930 shares (S_t) from table 5 is

$$S_t = [1 + \exp(1.544 - 0.022\,(t-1900))]^{-1}.$$

Chart 3

U.S. Employment Distribution by Occupation 1900–1980



production labor share predicts a 1980 share of 37.4 percent compared with the observed 34.1 percent.

Table 5 and charts 3 and 4 show that the functional role of the typical American employee is progressively moving away from the final mechanical step of commodities production — that is, fabrication assembly, or packaging.[27] More than 50 percent of employment is now concentrated in analysis, design, managing and recording processes, and sales, while, by inference, U.S. capital (or foreign labor) is occupied to a larger extent in mechanical production. Some observers decry this as the initial symptom of industrial calamity:

> The result is the evolution of a new kind of company: manufacturers that do little or no manufacturing and are increasingly becoming service-oriented. They may perform a host of profit-making functions — from design to distribution — but lack their own production base. In contrast to traditional manufacturers, they are hollow corporations.[28]

Yet this evolution simply reflects the operation of the law of comparative advantage. As U.S. labor has become more productive — due to increased human and nonhuman capital — the opportunity cost of its use in lower-valued stages of production has risen. Those production processes in which capital cannot sufficiently substitute for (or augment) labor must be ceded to foreign lower-cost labor.[29] This view of labor complements the conclusion of an analysis of the performance and competitiveness of U.S. multinational corporations by Lipsey and Kravis:

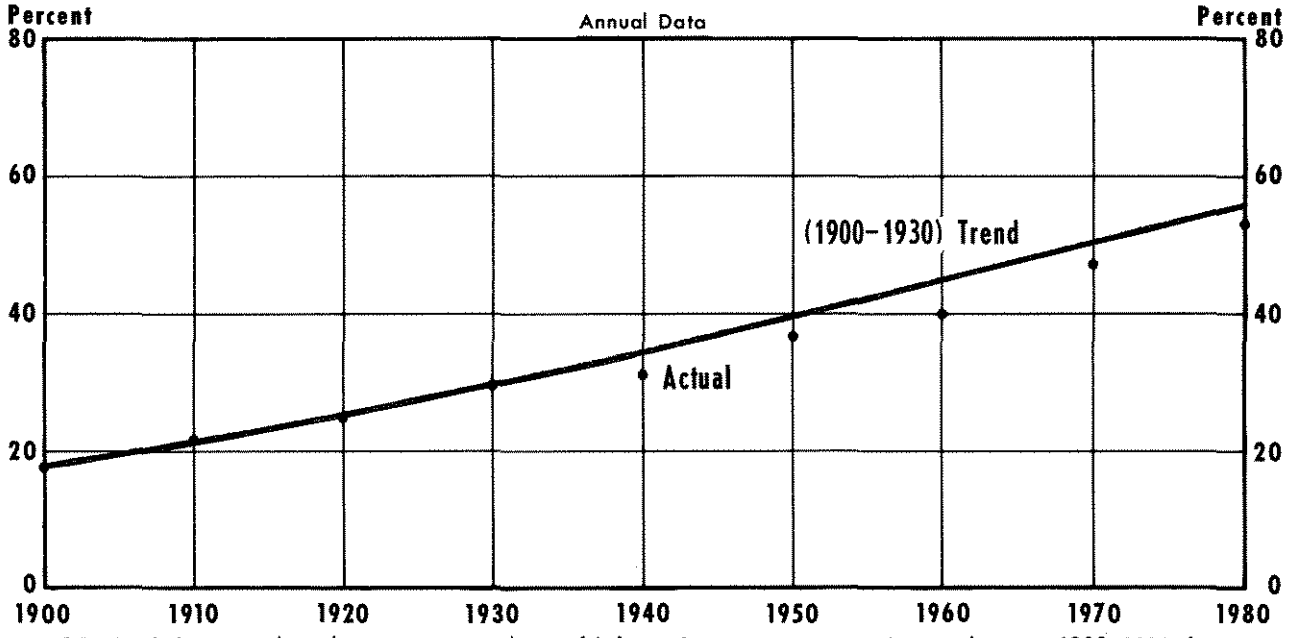
[27]This notion — that innovation and investment make the production process more roundabout or lengthen the period of production — is the focus of a long-standing debate in economic theory. It is at the core of the Austrian approach to capital theory; see "The Austrian Theory of Capital and Interest," chapter 12 in Blaug (1985).

[28]*Business Week* (1986), p. 57. Ironically, the same article positively assesses several companies whose primary activities are product research and development distribution with production done in foreign countries due to high domestic labor costs: Nike Shoe (German), Emerson Radio Corp. (U.S.), Pitney Bowes Inc. (U.S.) and IBM (U.S.).

[29]The process works in reverse as well. Feder (1987) quotes Steven Walleck, head of manufacturing consulting for McKinsey & Co. in Cleveland, as claiming "major shifts from labor intensive overseas plants to the United States usually follow the design of new products especially suited for automated manufacturing and the introduction of new manufacturing systems." An interesting example of this is the recent agreement between Inland Steel (U.S.) and Nippon Steel (Japan) for a joint venture, a cold-roll steel mill to be built in South Bend, Indiana; see Kotlowitz (1987). This announcement followed by less than three months the Nippon Steel decision to close 12 of its steel mills in Japan; see Cullison (1987).

Chart 4

Share of U.S. Workers in U.S. Information Provision/Decision Making 1900–1980



NOTE: Logistics curve based on percentage share of information services occupation employment 1900–1930; for details, see footnote 26.

This record is consistent with the view that American management and technology remained competitive, and is at variance with the argument sometimes made that the fall in the share of the U.S. in world manufactures exports was due to management failures and declines in technology. Perhaps the greater integration of the world economy with respect to transport and communications, and hence to the ease of managerial control over activities in distant locations, facilitated the expansion of affiliate exports in the 1957–77 period, but even so, American management should be credited with taking advantage of these opportunities. And since 1977, American-controlled firms abroad have maintained their shares in a rapidly growing world market, with powerful competition from Japan and some other industrial countries and the advent of new competitors.[30]

[30]Lipsey and Kravis (1986), p. 24.

The Lipsey-Kravis hypothesis is consistent with the persistent downward trend of the postwar share of manufacturing *employment*. Yet, since the share of U.S. *output* in manufacturing has been constant over this period, this trend does not imply the demise of the manufacturing sector. Moreover, if the other industrial economies have experienced similar trends in employment and output shares, these trends can be interpreted as a normal stage of advanced industrialization.

International Comparisons of Output and Labor Distribution

Throughout the 20th century, all advanced economies have undergone parallel transformations in their output and employment distributions. In each of the advanced economies, the shares of labor and output

in agriculture have diminished greatly. For example, as table 6 shows, the Japanese share of output in agriculture was more than 54 percent in 1890 and the corresponding employment share was 76 percent. These shares were somewhat smaller for France and the United States, and considerably smaller for Germany and Great Britain. Over the succeeding 60 years, in these countries agricultural activity declined, while their goods production sectors' share rose.

From 1950 to 1984, while the specific patterns of the production and output evolution vary somewhat, the five industrial economies share three key features. First, the proportion of goods production to real gross domestic product (GDP) peaked between 1960 and 1970, and has fallen to less than 40 percent for each, with the decline smallest for Japan.[31] Second, the share of employment in goods production, which also peaked between 1960 and 1970, has declined for each country from 1970 through 1984.[32] Third, by 1984, each nation had similar output and employment shares in services production.[33]

Some semblance of these long-term output and labor shifts can be seen in the three developing economies included in table 6: Greece, Spain and Turkey. Over the 1960–84 span, employment and output shares declined most in agriculture; while these proportions rose for both goods and service production, the largest increases were in the service sectors. This pattern resembles the shifts during 1870–1940 in the U.S. economy (see table 4).

[31]GDP is GNP less net factor income from abroad.

[32]Once again, the Japanese decline is slight, but Japan began the 1960s with by far the largest reservoir of agricultural employment, a reservoir that over the next 24 years declined by 21.3 percentage points. This employment outflow contributed a large low-cost inflow into manufacturing which the other industrial economies had long since absorbed. This pattern is similar to the decline in U.S. agricultural employment during 1870–1940; see discussion above, p. 12 and table 4.

[33]This similarity probably will become even closer as Japan reduces its inefficient share of agricultural labor. Declining Japanese agricultural employment and protectionist inefficiencies were the topic of recent reviews in the *Wall Street Journal* (Darlin (1986)) and *The Economist* (1987). Also, the Bank of Japan was recently quoted [Bank of International Settlement (1987)] as describing its economy in terms of duality, with relatively more rapid expansion expected in the service sector: "sluggish mining and industrial production, declining business activity in the manufacturing sector" contrasting with the fixed investment by non-manufacturers: "which have benefitted from the effects of the year's appreciation and low oil prices, are showing unexpected firmness, and they are limiting the deceleration of the economy as a whole... With the sustained increase in the non-manufacturing sector, the total number of employees will grow modestly."

CONCLUSION

The postwar rise of the U.S. economy's service sector continues trends in output and employment that reach back well over a century in U.S. history. The employment shift has much to do with slower productivity growth in services, the causes of which are not well understood. This evolution is not unique to the economy of the United States, but parallels changes in other industrial nations and, to some extent, developing economies as well.

The rising share of output and employment in the U.S. economy's services sector is even more pronounced when analyzed in terms of occupational categories. Moreover, the capital distribution in the United States also has been shifting toward service production. These are not symptoms of impending disaster for the U.S. economy. Rather, they are evidence of its efficient long-term evolution, propelled by the relatively more rapid growth of labor productivity in commodities than in services. Clearly, this evolution enhances the economy's capacity to provide rising standards of living for consumers and occupational satisfaction for workers.

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Table 6

International Comparisons of Output (Y) and Employment (E) Percentage Distributions among Agriculture (A), Goods (G) and Services (S), for Some OECD Economies

		1890			1950			1960			1970			1980			1984		
		A	G	S	A	G	S	A	G	S	A	G	S	A	G	S	A	G	S
Developed Economies[1]																			
France	Y	37.0	32.0	30.0	23.0	46.0	31.0	9.9	43.1	47.0	6.7	44.0	49.3	5.0	32.4	62.6	5.4	30.7	64.3
	E	48	25	27	27.0	26.2	25.9	22.4	38.1	39.5	13.5	37.2	47.2	8.7	35.9	55.5	7.9	33.0	59.1
Germany	Y	19.6	25.0	55.4	10.4	43.7	45.9	6.5	48.7	45.8	3.8	51.7	44.5	2.0	37.8	60.1	2.2	36.0	61.9
	E	36	39	25	16.9	46.6	36.4	10.3	57.5	32.2	8.6	48.6	42.8	5.8	43.5	52.7	5.6	41.3	53.1
Japan	Y	54.3	16.2	29.5	24.4	31.5	44.1	13.3	37.5	49.2	6.4	41.4	52.2	3.7	36.5	59.8	3.4	38.2	58.4
	E	76	10	13	42.4	23.9	33.7	30.2	28.0	41.8	17.4	35.2	47.4	10.4	34.8	54.7	8.9	34.8	56.3
U.K.	Y	9.7	36.9	53.4	5.6	46.2	48.2	3.3	36.9	59.8	3.1	36.0	60.9	1.9	31.6	66.6	1.9	31.6	66.6
	E	15	54	31	5.6	49.0	45.4	4.2	47.2	48.5	3.2	43.2	53.6	2.6	36.3	61.1	2.6	32.9	63.6
U.S.	Y	17.1	25.6	57.3	7.2	37.7	55.1	3.9	32.3	63.8	3.4	30.9	65.8	2.9	28.2	68.9	2.4	29.8	67.8
	E	42	28	30	11.4	33.8	54.7	8.3	34.6	57.1	4.5	33.2	62.3	3.6	29.3	67.1	3.3	28.5	68.2
Developing Economies[2]																			
Greece	Y							23.0	20.0	57.0	16.2	22.7	61.1	12.8	22.8	64.4	12.2	19.9	67.9
	E							53.9	18.6	27.5	38.9	25.5	35.6	30.7	28.1	41.2	29.4	27.8	42.8
Spain	Y							30.7	37.6	31.7	12.4	28.5	59.2	10.0	30.8	59.2	N.A.	N.A.	N.A.
	E							42.3	31.3	26.3	29.5	36.5	34.0	18.9	35.3	45.9	18.0	32.7	49.3
Turkey	Y							36.9	18.7	44.4	28.0	27.1	44.8	22.9	26.7	50.4	21.0	26.5	50.5
	E							78.3	10.1	11.6	67.6	14.1	18.3	60.7	15.5	23.8	57.9	17.1	24.9

[1]The data for 1890 and 1950 vary in time of observation by as much as 5 years before or 1 year after column headings. Also, the output data are centered averages of several years' observations whose mean time of observation is at or slightly earlier than given date. See *Long-Term Economic Growth*, Tables D67-79 and D130-144 for details. For 1960 and later, the OECD data include utilities with manufacturing, mining and construction — the Goods column; prior to 1960, utilities are included in Services.

[2]Not available prior to 1960.

SOURCE: 1890 and 1950: U.S. Department of Commerce, *Long-Term Economic Growth 1860–1970*, Series D-67 to D-81 and D-130 to D-144; for 1960–84: OECD *National Accounts of OECD Countries*, Constant Dollar (1970 Prices) Gross Domestic Product; *Labor Force Statistics*; OECD Economic Surveys 1985/1986 — *Greece, Spain, Turkey*.

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